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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,991	03/24/2004	Vijay Tewari	42P17568	6772

59796 7590 11/28/2008

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EXAMINER	
SILVER, DAVID	
ART UNIT	PAPER NUMBER
2128	
MAIL DATE	DELIVERY MODE
11/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/808,991	TEWARI ET AL.	
	Examiner	Art Unit	
	DAVID SILVER	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 19-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 19-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-40 were originally presented for examination.
2. Claims 1-40 were rejected.
3. Claim 18 was cancelled and therefore withdrawn from consideration **(Amendment dated 1/9/08)**.
4. Claims 1-17 and 19-40 are currently pending in Instant Application.
5. Examination of the Instant Application was changed to Examiner David Silver **(See paragraph 1 of Office Action dated 2/04/2008)**.
6. On 2/04/2008 a 37 C.F.R. 1.105 Requirement for Information was sent out to the Applicants. The requirement asked the Applicants to narrow down two IDS of 259, and 34 references to something that would not create a serious burden on the Office.
7. Applicants' response to the Requirement was filed on 8/4/2008.
8. Applicants are thanked for reviewing the IDSs to find the documents which they believe to be most relevant.
9. The Instant Application is not currently in condition for allowance.

Priority

10. Priority is not claimed **(03/24/2004)**.

Response to Arguments

Response: Claim Objections

11. Applicants are thanked for obviating the drawings objection. Specifically, the objection has been withdrawn in view of cancellation of the respective claim 18.

Response: 35 U.S.C. § 102 / 103

12. **Applicants argue:**

12.1 "Independent claims 1, 24, 34 and 36 have been amended to include a similar feature of: listing the device VM as an available hardware device during VM bootstrap initialization; and allowing one or more other VMs to use the device VM as the emulated hardware device. Support for this amendment can be found in the specification at least in paragraph [0029].

12.2 Nelson and Bugnion, either taken alone or in combination, do not teach or suggest this feature. For at least this reason, amended independent claims 1, 24, 34 and 36 and their respective dependent claims are distinguishable from Nelson and Bugnion, either taken alone or in combination. Accordingly, Applicants respectfully request that the rejections to these claims under 35 U.S.C. § 102(b) be reconsidered and withdrawn." (Remarks: page 10)

13. **Examiner Response:**

13.1 Applicants' arguments have been fully considered but are moot in view of new grounds of rejection necessitated by amendment.

Claim Interpretation

MPEP 2111.04 recites, in part:

Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. However, examples of claim language, although not exhaustive, that may raise a question as to the limiting effect of the language in a claim are: (A) " adapted to " or "adapted for " clauses; (B) " wherein " clauses; and (C) " whereby " clauses. (emphasis added by Examiner)

The determination of whether each of these clauses is a limitation in a claim depends on the specific facts of the case.

1. Limitations drawn to allowing, enabling, making capable of, or making optional a function's performance do not further limit a claim. See MPEP 2111.04.
2. In claim 1, the term "allowing" and "configuring [[]] to" fails to properly limit the claim(s). The meaning of this term is not one that limits a claim to a particular structure, nor recites a functionally limiting language, nor recites required steps to be performed. The language merely "allows" and makes optional something to happen / a feature to exist, but does not necessitate it. Accordingly, it does not further limit the claim. Therefore, patentable weight is not given to the relevant features. See MPEP 2111.04. The inconclusively of whether the term necessitates a function or not stems from the non-necessitated language within the Specification. For example, in paragraph PGPUB 0012, the Specification recites: "Other embodiments may be utilized and structural, logical, and electrical changes may be made without departing from the scope of the present invention.". The Specification is replete with what "may" happen, which merely describes optional features. Just because something may happen does not necessitate it to happen. Reviewing the claim, the

limitation in its entirety correlates to the option of having the feature, but not necessarily its actual performance / structural presence. According to the MPEP, claims must be interpreted as broadly as possible in view of the Specification. Given that the Specification and the claims use the above-exemplified optional language, the broadest most reasonable interpretation of the term is to make the feature optional, and not necessitated. Therefore, the language is interpreted as not further limit and is not given patentable weight. This is further evidenced by a parallel comparison. Attention is drawn to MPEP 2106.01.I, which recites, in part: "Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process", implying that the mere capability of being executed does not constitute the actual execution of a program and therefore classification of said program as a process (emphasis added).

3. Identical claim interpretation as presented above is for other claims which may be drawn to "enabling", "allowing" or being able to perform functions or have structural features without ever necessitating their existence. To further exemplify the case. An individual may be "able", "operable", "enabled", etc, to write with a pencil, or capable of writing with a pencil. However, the individual may not be writing with a pencil. In fact, the individual may not even be in possession of a pencil. Such ability, and enablement is not limiting in scope as the function and structure is not necessitated.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:
Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

MPEP 2106.01.I reads as follows:
Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process and USPTO personnel should treat a claim for a computer program, without the computer-readable medium needed to realize the computer program's functionality, as nonstatutory functional descriptive material. When a computer program is claimed in a process where the **computer is executing** the computer program's instructions, USPTO personnel should treat the claim as a process claim. **
When a computer program is recited **in conjunction with a physical structure**, such as a computer memory, USPTO personnel should treat the claim as a product claim. **

MPEP 2106.01 reads as follows:
Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context,
"functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and

Electronics Terms 308 (5th ed. 1993).)
"Nonfunctional descriptive material" includes but is not limited to music, literary works, and a compilation or mere arrangement of data. **Both types of "descriptive material" are nonstatutory when claimed as descriptive material per se**, 33 F.3d at 1360, 31 USPQ2d at 1759.

MPEP 2106 recites, in part:
"...USPTO personnel shall review the claim to determine it produces a useful, tangible, and concrete result. In making this determination, the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the **final** result achieved by the claimed invention is "useful, tangible, and concrete."

4. Claims 1-17 and 19-40 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

4.1 As per claim 34, the language is/are drawn to a computer program which is **neither executed by a computer, nor stored** on a physical structure. It is noted that in view of the above Claim Interpretation section language such as "configured to", "capable to", "able to", be executed, or to be stored, is not given patentable weight as the language does not necessitate function. Accordingly, such limitations do not further limit the claimed program to be executed or stored. Therefore, the claim is drawn to descriptive material, per se and is therefore nonstatutory. Furthermore, the medium, according to the claimed invention is not tangible. Meaning, the claimed invention, even if it were drawn to a medium, would not be in a statutory realm, because the medium is not tangible. (PGPUB "[0009] Thus, a machine-readable medium may include [[]] a transmission over the Internet, electrical, optical, acoustical or other forms of propagated signals (e.g., carrier waves, infrared signals, digital signals, etc.) or the like.")

4.2 As per exemplary claim 24, in this instance, absent an explicit and deliberate definition in the specification that the product includes an appropriate medium or hardware elements, the claims are directed to **software, *per se***. Additionally, software, *per se*, is not considered concrete (MPEP 2106). The position that the device virtual machine is supported by PGPUB para 0008: "Embodiments of the present invention may be implemented using software, firmware, microcode, hardware, etc., or by any combination of various techniques.".

4.3 As per claim 1, the claim is deficient because it lacks a **final** result that is concrete, useful, and tangible. Tangible results may include (depending usage and definitions in the Specification) final

results that are stored, displayed, printed, or otherwise tangibly output, or cause physical article changes. The listing of the device VM is not necessarily a tangible output. Furthermore, the method claims are nonstatutory because the claim is neither 1) tied to another statutory class, nor 2) transforms underlying subject matter to a different state or thing.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-6 9-17, 19-29 32-40 rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson **(US 6,961,941)**, in view of VMWare's "User's Manual VMWare Workstation", Version 3.2, ("VMWare").

Per claim 1: A method comprising: configuring a device virtual machine (VM) to emulate a hardware device **(column 1 lines 27-28, Fig. 1 [200])**,

wherein the device VM includes device emulation code used to emulate the hardware device **(column 1 lines 34-37)**.

Nelson however does not expressly disclose listing the device VM as an available hardware device during VM bootstrap initialization; and allowing one or more other VMs to use the device VM as the emulated hardware device.

VMWare however discloses an analogous system having the said feature **(page 18 section IDE Drives ("CD-ROM can be a physical device or an ISO image file") - when the CD-ROM is an ISO image file, then the CD drive is being emulated; page 223 section "Adding DVD or CD-ROM Drives to a Virtual Machine"; the listing is implicitly provided by the BIOS - See page 165**

section Installation Tips, paragraph 3, where the CD-ROM drive is moved up).

It would have been obvious to one of ordinary skill in the art <virtual machines / emulation> at the time of Applicant's invention to combine the references in order to be able to boot from CD image. This ability is critical because many operating systems require the use of CDs, however, many other operating systems (such as Linux distributions) allow users to download ISOs containing the CD in data form. The ability to list and boot from the ISO bypasses the costs and time associated with burning a blank CD for the sole purpose of installing the OS, and then discarding the disk.

Per claim 2: The method of claim 1, wherein the device VM is created dynamically. **(column 3 lines 51; functionally equivalent).** Nelson mentions scheduling of VMs which is functionally equivalent to a VMs being created dynamically.

Per claim 3: The method of claim 2, wherein the device VM is created dynamically by a virtual machine monitor (VMM) **(column 1 lines 56-60, Fig. 1 [300])** in response to a request for a device needed to provision a new client VM being created.

Per claim 4: The method of claim 1, wherein a virtual machine monitor (VMM) uses the device VM as the emulated hardware device. **(column 1 lines 52-55, Fig. 1)**

Per claim 5: The method of claim 1, wherein a virtual machine monitor (VMM) allocates the device VM to a client VM. **(column 1 lines 57-62)**

Per claim 6: The method of claim 1, wherein a client virtual machine (VM) uses the device VM as the emulated hardware device. **(column 7 lines 3-7, Fig. 1)**

Per claim 9: The method of claim 1, wherein the device VM is used to emulate one or more homogeneous hardware devices. **(column 1 lines 27-33; functionally equivalent)**

Per claim 10: The method of claim 1, wherein the device VM is used to emulate one or more heterogeneous hardware devices. **(column 1 lines 27-33; functionally equivalent)**

Per claim 11:The method of claim 1, wherein configuring the device VM to emulate the hardware device comprises: determining which resources are needed to emulate the hardware device **(column 1 line 66)**; if the determined resources include a hardware resource, sending a request to a virtual machine

monitor (VMM) to allocate the hardware resource for the device VM **(column 1 lines 64-67)**; and configuring the allocated hardware resource to run the device emulation code.

Per claim 12: The method of claim 11, wherein the device VM and the VMM communicate via shared memory. **(column 1 lines 27-28, Fig. 1 [200])**.

Per claim 13: The method of claim 11, wherein the device VM and a client VM communicate via shared memory. **(column 1 lines 27-28, Fig. 1 [200])**.

Per claim 14: The method of claim 11, wherein the device VM and a client VM communicate via message passing. This claim is rejected as being necessarily inherent in the prior art. Clearly, Nelson discloses message passing in Figure 1. Furthermore, message passing is shown in Nelson by setting flags **(column 11 lines 10-25)**.

Per claim 15: The method of claim 11, wherein the hardware resource is an allocated processor execution thread. This claim is rejected as being necessarily inherent in the prior art. **(column 4 line 14)**.

Per claim 16: The method of claim 11, wherein the hardware resource is an allocated processor core. This claim is rejected as being necessarily inherent in the prior art. **(Fig. 1 [100] discloses hardware resources)**

Per claim 17: The method of claim 11, wherein the hardware resource is an allocated processor. This claim is rejected as being necessarily inherent in the prior art. **(Fig. 1 [100] discloses hardware resources)**

Per claim 18: The method of claim 17, wherein the processor is one of a logical processor, a processor core and a stand-alone processor. **(Fig. 1 [100] discloses hardware resources)**

Per claim 19: The method of claim 11, wherein the hardware resource is emulated using special purpose microcode. **(column 7 line 9)**

Per claim 20: The method of claim 11, wherein the hardware resource is emulated using firmware. **(column 7 line 9; drivers e.g. firmware)**

Per claim 21: The method of claim 11, wherein the hardware resource is a special- purpose instruction set extension. **(column 7 line 9)**

Per claim 22: The method of claim 11, wherein the hardware resource is emulated using a reconfigurable hardware block. **(column 7 line 20; a network device is functionally equivalent to a reconfigurable hardware block)**

3. Claim 23 is similar to claim 14. Therefore, it is rejected for the same reasons as claims 14.

As per claims 24-29, 32-33, note the rejection of claims 1-6, 9-10 above. The Instant Claims recite substantially same limitations as the above-rejected claims and are therefore rejected under same prior-art teachings.

As per claims 34, 35, note the rejection of claims 1, 11 above. The Instant Claims recite substantially same limitations as the above-rejected claims and are therefore rejected under same prior-art teachings.

As per claims 36-40, note the rejection of claims 1-3, 9-10 above. The Instant Claims recite substantially same limitations as the above-rejected claims and are therefore rejected under same prior-art teachings.

6. Claims 1-6 9-17, 19-29 32-40 rejected under 35 U.S.C. 103(a) as being unpatentable over Bugnion **(US 6,496,847)**, in view of VMWare's "User's Manual VMWare Workstation", Version 3.2, ("VMWare").

Per claim 1: A method comprising: configuring a device virtual machine (VM) to emulate a hardware device (column 7, lines 13-15) wherein the device VM includes device emulation code used to emulate the hardware device (column 7, lines 13-15). Nelson mentions device emulator which is functionally equivalent to device virtual machine.

Bugnion however does not expressly disclose listing the device VM as an available hardware device during VM bootstrap initialization; and allowing one or more other VMs to use the device VM as the emulated hardware device.

VMWare however discloses an analogous system having the said feature **(page 18 section IDE Drives ("CD-ROM can be a physical device or an ISO image file") - when the CD-ROM is an ISO image file, then the CD drive is being emulated; page 223 section "Adding DVD or CD-ROM Drives to a Virtual Machine"; the listing is implicitly provided by the BIOS - See page 165**

section Installation Tips, paragraph 3, where the CD-ROM drive is moved up).

It would have been obvious to one of ordinary skill in the art <virtual machines / emulation> at the time of Applicant's invention to combine the references in order to be able to boot from CD image. This ability is critical because many operating systems require the use of CDs, however, many other operating systems (such as Linux distributions) allow users to download ISOs containing the CD in data form. The ability to list and boot from the ISO bypasses the costs and time associated with burning a blank CD for the sole purpose of installing the OS, and then discarding the disk.

Per claim 7: The method of claim 1, wherein a virtual machine monitor (VMM) allocates the device VM to an operating system (OS) hosting the VMM**. (column 7, lines 13-17; Fig. 3; functionally equivalent)**

Per claim 8: The method of claim 1, wherein an operating system (OS) hosting a virtual machine monitor (VMM) uses the device VM to emulate the hardware device. **(column 7, lines 17-21; Fig. 3; functionally equivalent)**

Support for Amendments and Newly Added Claims

Applicants are respectfully requested, in the event of an amendment to claims or submission of new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution. MPEP 714.02 recites: "Applicant should also specifically point out the support for any amendments made to the disclosure. See MPEP § 2163.06. An amendment which does not comply with the provisions of 37 CFR 1.121(b), (c), (d), and (h) may be held not fully responsive. See MPEP § 714." **Amendments not pointing to specific support in the disclosure may be deemed as not complying with provisions of 37 C.F.R. 1.131(b), (c), (d), and (h) and therefore held not fully responsive.** Generic statements such as "Applicants believe no new matter has been introduced" may be deemed insufficient.

Requests for Interview

7. In accordance with 37 CFR 1.133(a)(3), requests for interview must be made in advance. Interview requests are to be made by telephone (571-272-8634) call or FAX (571-273-8634).

Applicants must provide a detailed agenda as to what will be discussed (generic statement such as "discuss §102 rejection" or "discuss rejections of claims 1-3" may be denied interview).
The detail agenda along with any proposed amendments is to be written on a PTOL-413A or a custom form and should be faxed (or emailed, subject to MPEP 713.01.I / MPEP 502.03) to the Examiner at least 3 days prior to the scheduled interview.

8. Interview requests submitted within amendments may be denied because the Examiner was not notified, in advance, of the Applicant Initiated Interview Request and due to time constraints may not be able to review the interview request to prior to the mailing of the next Office Action.

Conclusion

9. All claims are rejected.

10. The Instant Application is not currently in condition for allowance.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Silver whose telephone number is (571) 272-8634. The examiner can normally be reached on Monday thru Friday, 10am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from

either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/ DS /
David Silver, Patent Examiner
Art Unit 2128

/Hugh Jones/
Primary Examiner, Art Unit 2128